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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/539,855	12/18/2005	Pill-Hwan Jung	5413IL-1	6518

22442 7590 11/26/2008

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EXAMINER	
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ART UNIT	**PAPER NUMBER**
1794	

MAIL DATE	DELIVERY MODE
11/26/2008	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/539,855	JUNG, PILL-HWAN	
	Examiner	Art Unit	
	LAUREN ROBINSON	1794	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *12 August 2008*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,4,5,9,10 and 12* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,4,5,9,10 and 12* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *20 June 2005* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Objections

Claim 1 is objected to because of the following informalities: The AG in this claim is capitalized and should be written as Ag. Appropriate correction is required.

Claim Rejections - 35 USC § 103

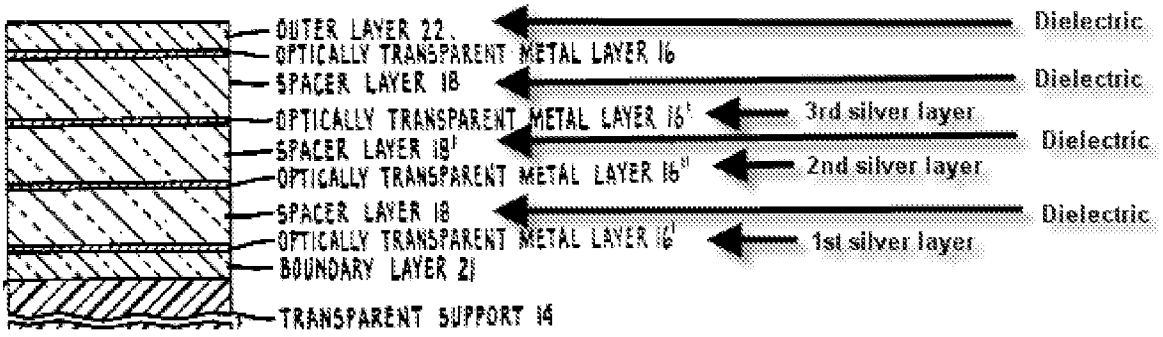
The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1, 9-10 and 12 are rejected under 35 U.S.C. 103(a) as being obvious over Hood et al. (US PN. 5, 071, 206) in view of Kusano et al. ("Thermal Stability…") published in 1986 in further view of Akimoto et al. (2002/0132376) as evidenced by Reptiles Down Under (http://www.reptilesdownunder.com/reptile/reptiles AsPets/enclosure/uv/).

Regarding claim 1: Hood et al. teach a multilayered structure (title) formed on a glass or plastic substrate (Col. 2, lines 42-50). The reference teaches that the multilayered structure can shade light in the infrared wavelength region (Figures) and can reflect (shade) light slightly in the wavelength region up to 400nm (Figures) which as evidenced by Reptiles Down Under, wavelengths up to 400nm represent ultraviolet (UV-A) radiation (light).

The multilayer structure is comprised of three metal layers of silver (abstract) (Figures) and the structure is illustrated below (Figure 2):



The reference teaches that the materials for each dielectric layers are not limiting and that each layer can be chosen from any materials such as a mixture of indium and tin oxides, which is known in the art to produce indium tin oxide also known as ITO, silicon dioxide, etc. (Col. 6, lines 1-12). Also, the reference teaches that the boundary layers are optional (abstract) and that by optional, they illustrate that one or both can be omitted (Col. 5, lines 59-67, Col. 6, lines 1-13 and 50-60). However, *they do not specifically disclose the above structure without the bottom boundary layer making the first silver in contact with the substrate, or that two of the above dielectrics are ITO making the other two, different dielectrics.*

Consider the above structure without the bottom boundary layer making the first silver in contact with the substrate

Although the reference does not specifically disclose the above 4 silver layered structure without the layer 21, the examiner notes that this would have been obvious. For example, the reference discloses that the boundary layers are optional and one would know that by omitting one of the layers such as the bottom boundary 21 layer,

this would save in manufacturing costs, etc. Specifically, one would recognize that if one desired to omit such layers due to production cost, they would chose layer 21 over layer 22 since in the figure above, layer 22 would protect the silver layer from the environment and since the silver is very important in the reference, one would find the removal of layer 21 while maintaining the layer of 22 to be both obvious and advantageous when trying to reduce costs. As such, it would have been obvious to one of ordinary skill in the art at the time of invention to modify Hood et al. to include that the layer 21 can be omitted while maintaining the rest of the layers in order to reduce production costs.

Consider two of the above dielectrics are ITO making the other two, different dielectrics.

Although the reference does not specifically disclose the above limitation, one would see as discussed that ITO, etc. layers can be used. However, one would also recognize that there is not limit to a specific dielectric and silver sequence in the reference and if one desired to obtain certain results, they would look to the prior art to obtain a specific structured sequence using the materials taught that would provide beneficial results. For example, Kusano et al. discloses that ITO on both sides of a silver layer has improved heat resistance while maintaining high visible transmission and when compared to other dielectrics on both sides of silver, the ITO/Ag/ITO sequence has more heat resistance during processing.

Hood et al. and Kusano disclose analogous inventions related to silver layers surrounding by dielectrics for the purpose of heat reflectance, etc. From Kusano, one would find it obvious to use specifically the ITO materials as taught in the material listing

of Hood et al. to surround the silver layers in order to obtain heat resistance as well as heat reflection. As such, it would have been obvious to one of ordinary skill in the art to modify Hood et al. to include that the dielectric layers that are on both sides of a silver layer can be ITO in order to obtain heat resistance and heat reflection.

From the modification above with omitting the bottom boundary layer from above, the following structure will be produced.

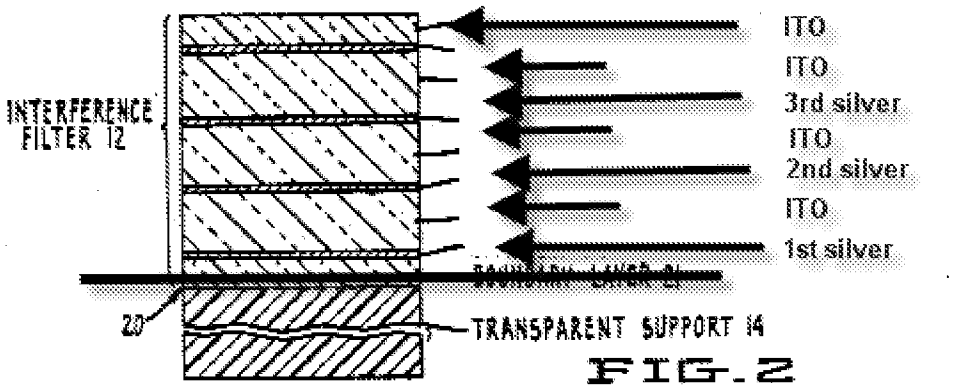


FIG. 2

Consider two other dielectrics as claimed

While this is not disclosed, the examiner notes that this would also be obvious as it is known specifically that SiO2 has excellent corrosion resistance as illustrated in Akimoto (0014) and since the above ITO/Ag/ITO sequence such as the sequence using the third silver layer would be desired to be protected so that it would continue to have the desired function as discussed, one would find it obvious that such a sequence should be protected. Since Hood et al. illustrates that ITO can be equivalently used as SiO2, one would recognize that the ITO/Ag/ITO sequence of the third silver can be

protected by replacing the first ITO and the outermost ITO with SiO2 as this would provide corrosion resistance on both sides of said sequence.

Therefore, one would see that the effect of still having ITO surrounding two of the silver layers along with the inner and outer silica layers would provide for a combination of protection as well as heat resistance and heat reflection. As such, it would have been obvious to one of ordinary skill in the art at the time of invention to modify Hood et al. to include that silica can replace the bottom and top ITO in order to obtain barrier properties to protect the inner most layers of the film.

Therefore, this teaching will be lead one to produce the following structure

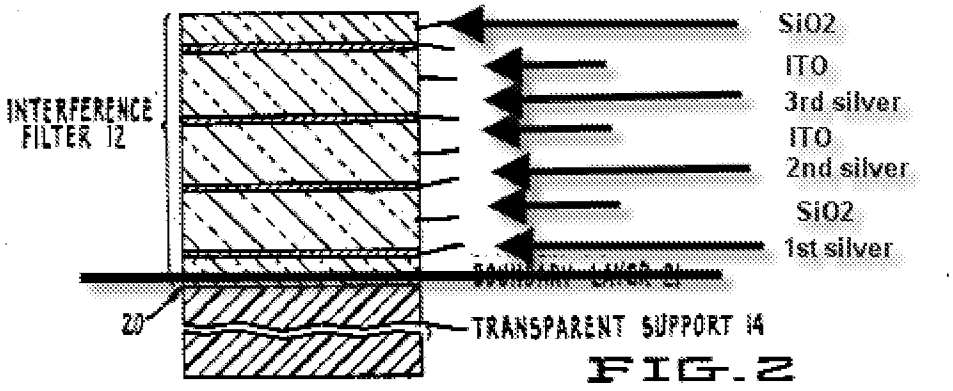


FIG. 2

meeting applicants' claim 1 **(Claim 1)**.

Regarding claim 9: The overall multilayered structure applied to the above substrate corresponds to a composite article meeting applicants' claim 9 **(Claim 9)**.

Regarding claim 10: Hood et al. teach that the above multilayered structure on a glass substrate can be used to produce a window construction (Col. 9, lines 3-18) **(Claim 10)**.

Regarding claim 12: Also, Hood teaches that the multilayered structure on the substrate can be used to produce a laminated safety glass (Col. 9, lines 3-17). They teach that the taught multilayered structures can be on a first transparent substrate of glass (pane) and another glass substrate can be applied on the top of the multilayered structure (Col. 9, lines 19-24). Also, a plastic sheet can be adhered between the two transparent substrates (Col. 8, lines 57-67) and the multilayered structure which shades infrared and UV can be formed on the top substrate against the plastic (Figures).

The examiner notes that in paragraph 0052 of applicants' disclosure, they teach that a suitable plastic which they are claiming that prevent glass panes from shattering is PVB. The reference teaches PVB as the plastic sheet and therefore, it is inherent that the plastic will have the same characteristic as claimed by applicants.

While the multilayered structure as illustrated is not the specific silver layered sequence as illustrated above, the reference teaching that the multilayered structures can be used to produce a safety glass in this manner corresponds to the reference teaching that a safety glass can be formed with the above multilayered structure in the same manner as discussed and thereby, corresponding to applicants' claim 11 **(Claim 12)**.

2. Claims 4 is rejected under 35 U.S.C. 103(a) as being obvious over Hood et al. (US PN. 5, 071, 206), Kusano et al. ("Thermal Stability…") and Akimoto et al. (2002/0132376) as applied to claim 1, in view of Cerao (http://www.cerac.com /pubs/proddata/y2o3. htm#anchor354721) as evidenced by Reed (http://www.ps

.missouri. edu/rickspage/refract/refraction.html) and Spi (http://www.2spi.com/ catalog/standards/ITO-coated-substrates-refractive-index-values.html).

Hood et al. teach applicants' invention of claim 1. However, *the reference does not teach Y2O3 layers in place of the SiO2 layers.*

While the above limitation is not disclosed, the examiner notes that this would have been obvious to one of ordinary skill. For example, while SiO2 was determined above to provide corrosion resistance to the desired ITO/Ag/ITO sequence, if one desired to modify this structure to obtain another desired property such as better protection for silver, they would know that Y2O3 is known in the art to be better at protecting silver than SiO2.

For example, Y2O3 is used to protect silver layers and shade in the UV and IR regions as illustrated by Cerao (Paragraph 8) similar to the SiO2 dielectric layer in the invention of Hood et al. However, Cerao teaches that the use of Y2O3, which has a refractive index of at least 1.7 (Graph), is advantageous over SiO2 since Y2O3 does not have reflection loss as seen with using SiO2 on silver (Paragraph 8).

Also, Hood et al. illustrates that any material can be used for the dielectric layers as long as the refractive index is between 1.4 and 2.7 (Col. 5, lines 60-67) and that the layers can be used to protect the silver and shade against UV and IR. Therefore, one of ordinary skill would recognize that the use of Y2O3 instead would be more advantageous than SiO2 for the function of protecting silver and provide better shading and that since it has a refractive index critical for dielectrics in Hood, one would see that it could be used. As such, it would have been obvious to one of ordinary skill in the art

at the time of invention to modify Hood et al. to include that the SiO2 layers can be replaced with Y2O3 with a refractive index of at least 1.7 in order to obtain enhanced silver protection as well as maintaining UV and IR shading within the structure as compared with SiO2.

Therefore, the following structure can be obtained:

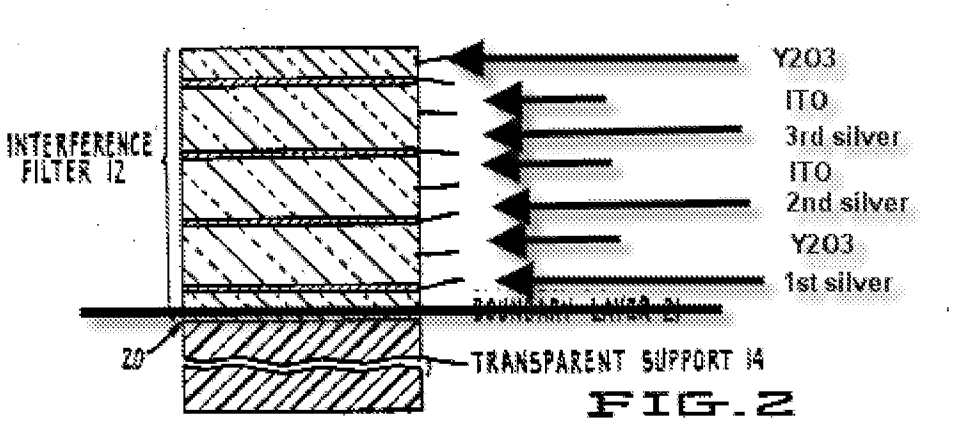


FIG. 2

From the illustration, it is seen that the multilayer structure will be comprised (has) seven layers with a first layer of Ag (16'), a second layer of Y2O3 (18), a third layer of Ag (16''), a fourth layer of ITO (18'), a fifth layer of Ag (16'), a sixth layer of ITO (18) and a seventh layer of Y2O3 (22). Each layer is formed "on" the preceding layer as the examiner notes that the terminology "on" means "over" and does not require contact with said layers. Therefore, the above structure corresponds to applicants' claimed layers structure.

Further, Hood et al. teach that the silver layers have a thickness ranging from 4 and 40nm (Col. 5, lines 40-41) and the dielectrics, including the ITO layers, will have a thickness of between 30 and 200 nm (Col. 5, lines 54-68) and these ranges overlap

applicants' thicknesses of their claimed layers providing a prima facie case of obviousness.

Also, as evidenced by Reed, silver has a refractive index of 0.18 (all), as disclosed above, Y2O3 has an index of at least 1.7, and Hood teaches that the layers are sputtered deposited which as evidenced by Spi, sputtered ITO films have an index of refraction of at least 2.05 at 400nm.

3. Claim 5 is rejected under 35 U.S.C. 103(a) as being obvious over Hood et al. (US PN. 5, 071, 206) in view of Flory ("Thin Films for Optical Systems") published 1995 as evidenced by Reed (http://www.ps.missouri. edu/rickspage/refract/refraction.html) and Spi (http://www.2spi.com/catalog/standards/ITO-coated-substrates-refractive-index-values.html).

Hood et al. teach applicants' invention of claim 1. However*, the reference does not teach that the SiO2 layers are ZrO2.*

While the above limitation is not disclosed, the examiner notes that this would have been obvious to one of ordinary skill. For example, ZrO2 is known in the art to be used to protect silver layers as illustrated by Flory (Pg. 125), similar to the SiO2 dielectric layer in the invention of Hood et al. However, Flory teaches that the use of IAD deposited ZrO2, having a refractive index of between about 2.05 (which allows for values slightly above and below such as 2.06) and 2.15 (Pg. 124), is advantageous over SiO2 since ZrO2 offers better protection to such layers than that of SiO2 on silver (Pg. 125).

Also, Hood et al. illustrates that any material can be used for the dielectric layers as long as the refractive index is between 1.4 and 2.7 (Col. 5, lines 60-67) and that the layers can be used to protect the silver and shade against UV and IR. Therefore, one of ordinary skill would recognize that the use of ZrO2 instead would be more advantageous than SiO2 for the function of protecting silver. Further, Flory teaches that the material can provide this property by IAD with a refractive index within the range critical to the invention of Hood et al. and Hood teaches that any material can be substituted within any of the layers as long as an index within the range is met, one of ordinary skill would recognize that ZrO2 would be capable of use in the invention of Hood et al.. Further, Hood teaches that the layers are deposited by sputtering and IAD deposition is known in the art to be a form of sputtering. Therefore, one would see that it would not only be advantageous to use such a layer but the method needed to obtain the structure in Hood would still be present during the use of IAD ZrO2 with the above indices.

As such, it would have been obvious to one of ordinary skill in the art at the time of invention to modify Hood et al. to include that the SiO2 layers can be replaced with the ZrO2 of Flory with a refractive index of about 2.05 to 2.15 in order to obtain enhanced silver protection within the structure as compared with SiO2.

Therefore, the following structure can be obtained:

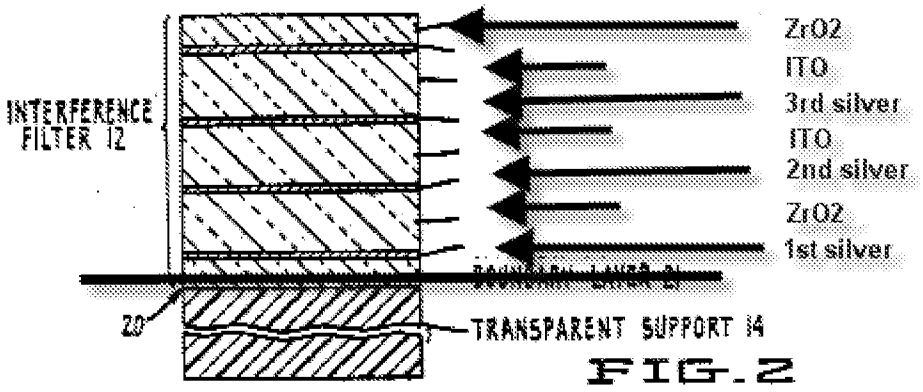


FIG. 2

From the illustration, it is seen that the multilayer structure will be comprised (has) seven layers with a first layer of Ag (16'), a second layer of ZrO2 (18), a third layer of Ag (16''), a fourth layer of ITO (18'), a fifth layer of Ag (16'), a sixth layer of ITO (18) and a seventh layer of ZrO2 (22). Also, as discussed, each layer is formed "on" the preceding layer as the examiner notes that the terminology "on" merely means "over" and does not require contact with said layers. Therefore, the above structure corresponds to applicants' claimed layers structure.

Further, the silver layers have a thickness ranging from 4 and 40nm (Col. 5, lines 40-41) and the dielectrics, including the ITO layers, will have a thickness of between 30 and 200 nm (Col. 5, lines 54-68) which overlap applicants' thicknesses of their claimed layers providing a prima facie case of obviousness.

Also, as evidenced by Reed, silver has a refractive index of 0.18 (all), as disclosed above, ZrO2 has an index of about 2.05 and 2.15 which overlaps applicants' claimed index as "about" provides for values slightly above and below, and as

evidenced by Spi, sputtering ITO films have an index of refraction of at least 2.05 at 400nm.

Response to Arguments

Applicant's arguments filed on August 12, 2008 have been considered. However, the newly added limitation of the silver layer having to be in contact with the substrate required new art and therefore, the applicants' arguments are moot in view of new grounds of rejection.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to LAUREN ROBINSON whose telephone number is

(571)270-3474. The examiner can normally be reached on Monday to Thursday 6am to 4pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Carol Chaney can be reached on 571-2721284. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Lauren E. T. Robinson
Examiner
AU 1794

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Examiner, Art Unit 1794

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